



SURVEY NOTES

Service to the State of Utah

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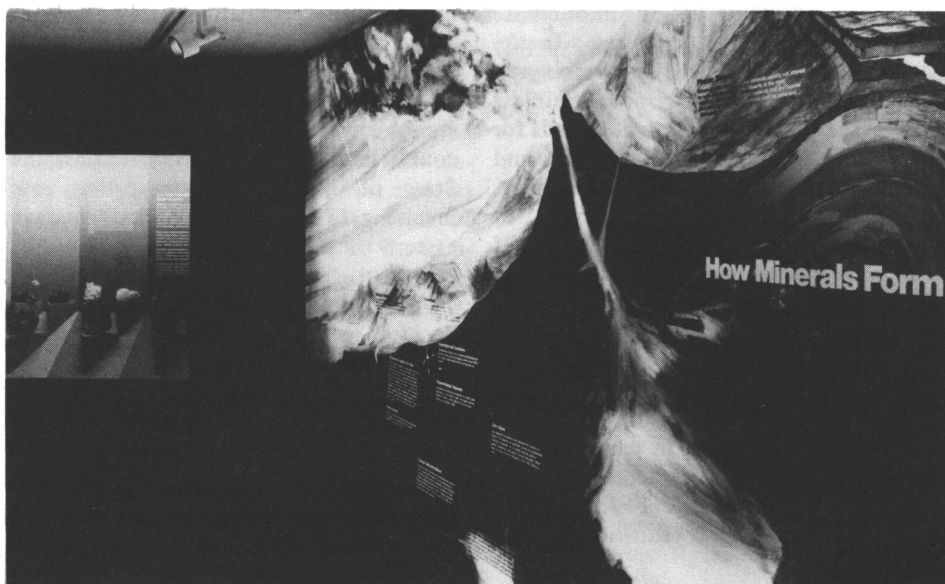
August 1980

MT. ST. HELENS

Bruce N. Kaliser, UGMS Chief Engineering Geologist, Lorayne Tempest Director of Comprehensive Emergency Management, and Wanless Southwick, Environmental Health Officer, were sent to Washington State by Governor Scott Matheson in early June in order to report back to him on the potential hazards from a future ash fall over Utah and to learn from the emergency operations there.

In Vancouver, Washington, two groups of geologists were housed at the Disaster Field Office, one to work full time with the news media at the Disaster Information Center and one to work with the Technical Information Network Office. Geologists assigned to the Disaster Information Center assembled material on the volcano, participated in one to three daily news conferences and answered geological inquiries. A third group of geologists was assigned to the field to monitor volcanic activity and to determine hazards from mudflows and other volcanic phenomena including the dams that were created across drainages by flowing debris. A fourth team of geologists worked in the Federal Building in the offices of the U. S. Forest Service and monitored remote recordings from seismographs and tiltmeters on the flanks of the volcano. They tried to interpret the new scientific data that emerged from the field, from aircraft overflight observations and from the instrumentation. These geologists then conveyed their findings to other emergency operations personnel and to the Technical Information Center and the Disaster Public Information Center.

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MINERAL COLLECTION GOES ON DISPLAY

FANTASTIC! One word to describe the new minerals display located in the Utah Museum of Natural History.

The Norton Hall of Minerals is not just an ordinary mineral collection. The display is based on a narrative approach to teach the public about the properties of minerals, their formation and history and the many uses man makes of them.

The central focus of the display is the \$750,000 private collection assembled by Alfred M. Buranek, purchased by Merlin J. Norton and donated to the museum. There is no other display equal to it between the West Coast and Denver. Many specimens rival those at the Smithsonian Institution. In fact, some of the specimens are the absolute finest in the world.

Other mineral collections in the hall include the Charles Strevell specimens, the Zinn collection of "thumbnail" minerals and the collection of Dr. Arthur Inglesby, donated by Ruth Waldo. At present there are 400 specimens on display.

The Hall also includes 10 dramatic murals showing the early use of minerals, man's interaction with them, volcanics and a three dimensional model of the Bingham Canyon mine.

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MT. ST. HELENS

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In this Mount St. Helens disaster, the government recognized the public's thirst for technical information and, in unprecedented fashion, made available widespread expertise at a single center.

VOLCANISM IN UTAH'S FUTURE?

There is little prospect for volcanism in Utah's future although evidence exists for volcanic eruptions in our state as recently as 1,000 years ago. In the vicinity of Santa Clara, in Washington County, there is a linear basaltic flow with a north-south trend that extends for over nine miles north of old U. S. 91 and almost one mile south of that highway. Direction of flow was from north to south from two vents in the vicinity of Diamond Valley, just east of Utah Highway 18.

In the Black Rock Desert, in Millard County, volcanics believed to be as recent as 1,000 to 4,000 years old occur west of Fillmore in what is called the Ice Springs Field. Immediately to the south lies the Tabernacle Field, believed to be 11,000 to 12,000 years old.

Volcanism in Utah is of another type entirely from the explosive pyroclastic outbursts at Mount St. Helens, with placid lava flows being the predominant mode. Because of this, potential hazard from volcanic eruptions in Utah seems very unlikely.

EARTHQUAKE INVESTIGATION

A magnitude 4.1 earthquake occurred in southeastern Utah County at 4:03 a.m. on May 24th. County Emergency Services Director, Jim Tracy, telephoned Chief Engineering Geologist, Bruce Kaliser to inform him of the earthquake which was quite widely felt in central Utah. The epicenter of the earthquake was near Elberta. Kaliser and Bill Lund of the UGMS Urban and Engineering Geology Section conducted a field investigation. Campers in a trailer camp at the El Nautica Yacht Club (near the northwest corner of Utah Lake) were relieved to learn that it was indeed an earthquake that disturbed them that morning.

At the Murray East and South Cottonwood Church Dairy, south of Elberta, a herd of cows being led out of the barn were startled by the quake, turned suddenly and ran, nearly trampling the dairyman who only narrowly escaped injury.

No evidence of ground effects nor any permanent damage was found.

SUPREME COURT SCUTTLES UTAH'S LAND HOPES

The U. S. Supreme Court in its May session reversed the ruling of two lower courts in a 5 to 4 decision against the State of Utah in an important case involving 157,000 acres of "lieu" lands in eastern Uintah County.

A Federal District Court first decided the case in Utah's favor which was unanimously upheld by a three-judge Court of Appeals. Under ordinary circumstances the appeal might never had been heard by the Supreme Court except for the extraordinary potential value of the mineral-rich lands involved.

Utah had selected the 157,000 acre block of lands in eastern Uintah County in the mid-1960's as a major part of its entitlement to about 255,000 acres of land not received at statehood or engulfed by creation and expansion of national parks, monuments, military reservations, wildlife refuges and other federal reservations. When Utah was made a state in 1896 it was granted entitlement to 4 square miles (sections) in each 36 square miles (townships) as State lands, largely for support of schools and other public institutions. However, the central part of the new state was already settled and privately owned, and little land was available there to convey to State ownership. Much of the outlying part of Utah was not well known and unsurveyed, and Utah's land entitlement was largely in name only. As large areas of the state were set aside in national forests, parks and other reservations, the problem of exchanging lands to keep even with the state's original entitlement became more acute. A peak was hit in 1964 when 120,000 acres changed hands in Utah's favor.

If Utah had won the 157,000 acres, it would have gained control of most of the rich, thick oil shale within its borders. Also involved were the two Federal prototype lease tracts (Ua and Ub) and about \$100 million in lease bonus money, annual rentals and accumulated interest on money held in escrow.

The Supreme Court decision tossed aside the historic basis of acre for acre exchange and injected a factor of dollar value. Just how this can be accomplished in advance of actual discovery and production of mineral values is a knotty problem not only for Utah but many other western states with the same problem of unresolved entitlement to state lands. The decision, which was termed "the most crippling economic blow the Supreme Court has ever inflicted upon Utah" by Governor Matheson, appears to open a Pandora's Box of protracted argument, negotiation and further litigation.

SHALLOW GROUNDWATER PROBLEM AGGRAVATES SANDY CITY CITIZENS

Residents of Sandy City, in the Salt Lake Valley have been annoyed by problems that have arisen recently over a rise in the water table over a two square mile area. Complaints to the City Council have brought a request to UGMS for assistance in resolving the matter. UGMS's Urban & Engineering Geology Section have devised a questionnaire to get necessary information. The questionnaire was mailed with the city water bills in June and it is expected that they will be returned with payments.

GEM AND MINERAL SHOW

The Tooele Gem and Mineral Society will have its 16th annual show on September 19, 20 and 21, 1980 at the Utah National Guard Armory at 1st and Vine Streets, Tooele, Utah. This year's theme is "Artistry in Gems". Times will be 10 a.m. to 10 p.m. on the 19th and 20th and 10 a.m. to 5 p.m. on the 21st. Admission is free and open to the public. The show will feature door prizes, lapidary and silversmith's exhibits, dealer sales, silent auctions and a snack bar.

MINERAL COLLECTION

(continued from page 1)

In the fall, the hall will feature a simulated underground mine. Visitors will be able to walk through the mine experiencing what it's really like to be underground. Minerals will be shown in their original state, water will be dripping in the background and even the temperature will be held constant, in simulation to the real thing.

Also of importance is the technical resource offered by the Buranek collection. Two-thirds of the specimens are in the museum vaults and are available for study by qualified researchers interested in minerology.

The welcomed addition is the result of a 3 year effort by the museum staff and tremendous financial support from the community and mineral industry. Museum hours are from 9:30 a.m. to 5:30 p.m. daily.

NEW UGMS PUBLICATIONS

Bulletin 116, *Great Salt Lake, a Scientific, Historical and Economic Overview*, edited by J. W. Gwynn, Ph. D., 1980, 400 pages, 16 in full color, 2 plates, \$12.00 over the counter and \$13.20 by mail.

Circular 65, *Summary of Oil and Gas Drilling and Production in Utah*, 1978, by K. W. Brown and H. R. Ritzma, May 1980, 86 pages, \$2.50 over the counter and \$3.25 by mail.

(Utah residents add 5% sales tax.)

SPRING DEVELOPMENT

Springs, or seepage zones as sources of culinary water for many cities and towns throughout the State are very significant public facilities. We take for granted the issuance of water from soil or rock but not infrequently we wonder whether the yield of the spring can be increased and, if so, in what manner. We must also, by necessity, concern ourselves with protection of the water quality to insure a source of water free from contamination. These critical questions can only be answered with a knowledge of the hydrogeology of the spring and its contributory groundwaters. Indeed, no spring should be modified by city officials, water works personnel or consultants

without such knowledge.

The hydrogeologic regime includes the recharge areas for the spring water; the nature, including hydraulic characteristics, of the aquifer (water bearing formation that feeds the spring), and the reason why the spring rises where it does from the ground. If in soil material, the spring may be controlled by a combination of topography and soil stratification, or perhaps by upward leakage from underlying bedrock, or by more complex geologic circumstances. If in bedrock, the spring may be controlled by the structure of the rock as well as topography.

Understanding why the spring is there makes it possible to (1) determine whether additional yields can be stimulated and (2) what area must be set aside as protective reserve around the point of issuance. The State Division of Environmental Health frequently calls for an arbitrary distance of 1500 feet to be fenced off as a protective zone. However, hydrogeologic studies may show that significantly smaller or, in some cases, even larger protection zones are justified. The proper zone can and should be predicated upon the hydrogeologic facts acquired at the spring site and its vicinity. Geologic mapping for some distance around the spring may be necessary to comprehend the entire regime. The outcome may be a suggested protective zone of irregular shape. For some springs, it may be necessary to restrict land use over a considerable area; for example, in karst terrain, sink holes quite remote from the spring may be the source for polluted waters directly feeding the groundwater reservoir in limestone aquifers.

A complete knowledge of subsurface conditions may not be gained in a short study for a water utility but a geotechnician with proper expertise can gain sufficient understanding to serve the needs of the community water authority in planning and designing its spring sources. Sound geotechnical advice can remove the mystery associated with springs and help provide the best possible water supply to the community.

This article is the second of a series of articles by Bruce N. Kaliser, Chief, Urban & Engineering Geology Section, to appear in "Survey Notes".

UTAHANS TOUR ALBERTA

Led by Governor Matheson, 26 Utahans with widely varied backgrounds and interests, spent June 22 to 25 on a fast-moving overview of Alberta's government and a look at its giant and fast-growing tar sands industry. The trip was mostly compressed into two very full days, the first at Fort McMurray where two huge mines and processing plants turn-out about 100,000 barrels per day of high quality synthetic crude oil. Raw material for the plants is mined from open pits in the huge Athabasca tar sand deposit, estimated to contain 680 million barrels of oil.

The party broke up into interest groups at Fort McMurray, some concentrating on the mine and processing plants, others on government affairs in the town. Fort McMurray, a remarkable resilient north-country community, has grown quite gracefully, from a frontier post of 1,000 people to a modern city of 35,000 in little more than a decade.

On the second day representatives of a dozen provincial and municipal agencies, including Premier Peter Lougheed, gave presentations, led discussions and answered questions on almost all phases of government related to tar sands.

At every turn the Utah group was overwhelmed with hospitality and afforded red carpet treatment. On Monday luncheons were hosted by Syncrude Canada, Ltd. and the Town of Fort McMurray. An evening reception and dinner was hosted by the Town of Fort McMurray and the Province of Alberta. Tuesday Premier Lougheed hosted a lavish reception and luncheon for the group and many guests at Government House, and an evening reception was sponsored by the Edmonton Chamber of Commerce and the City of Edmonton.

Howard Ritzma, UGMS assistant director, who had visited the Athabasca area in 1973 as the first tar sand plant was getting underway, was impressed with the orderly growth of Fort McMurray and with the two giant mines and plants. "It's difficult to comprehend a single mine and plant producing more oil than all the fields in Utah put together," he said. "But there it is — a technological triumph of great importance. Something like this could happen in Utah."



ENERGY DEMAND LESSENS

The Supply/Demand Committee of the Independent Petroleum Association of America presented its annual forecast of energy consumption in the U. S. compared with actual use in previous years. The forecast reported in the May 19, 1980 Oil and Gas Journal has been converted from trillions of BTU's to percent of total.

	Percent of Total		
	Actual	Forecast	
	1978	1979	1980
Oil	48.6	47.4	45.7
Natural Gas	25.6	25.5	25.9
Coal	17.9	19.4	20.4
Hydropower-			
Geothermal	4.1	4.2	4.3
Nuclear	3.8	3.5	3.7

Petroleum (oil and natural gas) furnished an estimated 72.9% of the nation's energy requirements in 1979. Total energy consumption estimated at 77.91 quadrillion BTU's (quads) in 1979 is predicted to drop 1.9% in 1980 to 76.4 quads mainly because of lessening economic activity and to some extent from conservation practices. Consumption was 78.15 quads in 1978.

BLM TO WITHDRAW LAVA FIELD

Public comment on proposed withdrawal to protect significant scientific, education and recreational values associated with the Tabernacle Hill Lava Field in Millard County is being sought by BLM.

The bureau has filed a withdrawal application with the Department of the Interior on 4,097.33 acres of land 10 miles southwest of Fillmore.

The proposed withdrawal would remove the area from settlement, sale, location or entry under the general land laws, including mining laws, subject to valid existing rights, but not from mineral leasing. The area consists of a tuff ring, caldera, spatter cones, a maze of lava tubes, pit crater and other features.

from Beaver County News

DIGGIN'S

GRAND VALLEY TO PARACHUTE

The town of Grand Valley in western Colorado's oil shale country was officially renamed "Parachute" on July 4, 1980. Parachute is located on Parachute Creek, type area for the Parachute Creek Member of the Green River Formation, renowned as the principal oil shale formation in the Piceance Creek Basin of western Colorado and the Uinta Basin in adjacent Utah.

TEN-YEAR FORECAST: U. S. COAL PRODUCTION TO INCREASE 62 PERCENT

The U. S. coal industry, currently able to produce at least 100 million more tons each year than is being used, forecasts domestic production of 1.25 billion tons annually by 1990, a 62 percent increase over 1979.

DOE TESTING STEAM INJECTION TO FREE HEAVY OIL IN UTAH

A major test to determine the effectiveness of injecting steam into a tar sand reservoir to free oil too viscous to pump has been started near Vernal, Utah, by the Department of Energy (DOE). Researchers from DOE's Laramie, Wyoming Energy Technology Center are injecting high-pressure steam at 480°F into a 500-550-ft. deep reservoir for flow tests at production wells spaced 54 to 78 feet away.

Initially, the fluid recovered from the production wells will be predominantly water with small amounts of oil. As the test moves into full operation, the percentage of oil is expected to increase, approaching a peak of 400 barrels per day before decreasing in the latter stages of the test. Up to 23,000 barrels of oil are estimated to be contained in the quarter-acre test site, part of the Northwest Asphalt Ridge.

Test results will be compared with earlier experiments at an adjacent site in which part of the oil in the formation was burned, and the heat used to thin surrounding oil.



DEPTH RECORD FALLS

The record for deep drilling in Utah has been surpassed by Placid Oil's No. 1 WXC-Barton test in NW SE 32, 16 S., 1 W., Juab County, which reached a total depth of 21,845 feet this Spring. Pipe is set to 21,560 feet and an extensive program of testing is planned. Penrod Drilling is contractor.

The previous record for a deep well was CIG Exploration No. C-1 Cook in eastern Summit County, drilled to 21,786 feet in 1976.

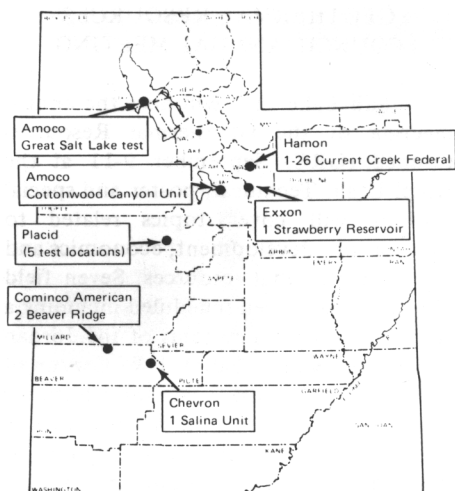
REMOTE HINGELINE ACREAGE DRAWS TOP BID AT UTAH STATE LEASE SALE

American Quasar Petroleum of New Mexico paid \$200,257.20, or \$387.11 an acre, for 520 acres in the hingeline area of the Thrust Belt in Juab County and was high bidder at a lease sale held June 30 by the Division of State Lands. Remote acreage in Juab, Utah, Sanpete, Sevier, Garfield and Wayne Counties drew high bids far higher than bids received in the area in recent years. Of the 86 tracts offered at the sale, 85 were sold. They comprise 46,691.91 acres. Only one 80-acre tract in Emery County, Tract no. 66, did not sell. Total income to the state amounted to \$1,889,206.93 and bids averaged \$40.46 per acre.

OIL SHALE LEASES TO BE GRANTED

The U. S. Department of Interior plans to grant up to four more prototype oil shale leases in Utah, Wyoming and Colorado.

The Interior Department granted six oil shale leases several years ago, two in Utah, two in Colorado and two in Wyoming. However, only the Colorado leases have been consistently developed. Activity on Utah's two leases, controlled by the White River Shale Project, has been held up by protracted litigation.



WILDCAT DRILLING EVIDENT IN WESTERN ROCKIES

Deep, expensive wildcat wells continue to probe the sparsely drilled western areas of the Rocky Mountain region. Interest is industry-wide and success at any one of the exploratory locations could, conceivably, open thousands of square miles to further drilling activity.

The Thrust Belt is, of course, the attraction for a large share of wildcat exploratory activity. Successes in Utah and Wyoming have demonstrated the huge potential of that very complex feature.

Amoco has completed its 10th well offshore in Great Salt Lake. Five wells have been completed south of the causeway across the lake. All five wells were unsuccessful. The company indicates they will now move their drilling barge back into the northern area of the lake.

Amoco is expected to continue evaluation of its oil discoveries north of the causeway to determine whether or not the low gravity crude found last year is commercially producible.

South of the Uinta Mountains, along the Thrust Belt feature, there are at least nine remote ventures under way in five Utah counties (see map).

Deep tests are by no means limited to the Thrust Belt. There is considerable interest in the huge Basin and Range Province in Utah, Idaho and Nevada.

The petroleum industry is intent on finding what the western portions of the Rocky Mountain region have to offer. In most of the areas mentioned here, operations are complicated and expensive and some tests are scheduled to 15,000 feet or deeper.

The Rocky Mountain region may be the "last frontier" for oil and gas exploration in the continental U. S., but it is a huge frontier and the potential is great.

from Western Oil Reporter

SYNFUEL PROGRAM NEEDS GO THROUGH THE ROOF

Fluor Corporation has estimated the supply and equipment requirements during the 1980's in order to achieve synfuel production of 1,500,000 B/D from coal and oil shale by 1990. The program would roughly require:

40 percent of the existing compressor manufacturing capacity in the U. S.

18 percent of all pressure vessel and tank capacity

28 percent of pump manufacturing capacity and about the same percentage of heater and boiler manufacturing capacity

26-27 percent of valve manufacturing capacity, and

10-11 percent of existing capacity to make steel castings.

Some items, such as pipe and structural steel, appear to be no problem, requiring only about 2 to 3 percent of existing U. S. capacity. And Fluor points out that the estimates do not reflect additions to manufacturing capacity which might occur, nor the possibility of procuring equipment on the world market.

Work force requirements are also large — 18,000 professionals, or 40 percent of the industry's complement, and 135,000 construction workers.

UP IN SMOKE

The taxes collected by the State of Utah on mineral production was slightly less than the taxes collected in the sale of cigarettes in 1979.

A DECISION ON LEASING OF TAR SANDS IN UTAH

A decision on leasing of tar sands in Utah will be made by August by the Bureau of Land Management, according to director Frank Gregg, but "My guess is that actual leasing of tar sands is about two years away," he said. Resumption of leasing, suspended in 1965, cannot be undertaken until completion of an environmental impact statement, either site-specific or programmatic, Gregg added.

Utah holds about 90% of U. S. reserves of tar sands but development cannot be started until BLM lands are available to create large enough blocks for economic mining. Since 1965, BLM has issued only leases for oil and gas on tar sands lands. Utah law provides a single lease on state land for extraction of any or all three resources.

SKYLINE COAL MINE PROJECT APPROVED

Approval of the first mining and reclamation permit for an underground mine in the western U. S. under new Office of Surface Mining regulations has been granted Coastal States Energy for the Skyline Coal Mine project near Scofield in central Utah.

The \$120 million Skyline project is a joint venture of Coastal States Energy, the coal operations subsidiary of Coastal Corp., and Getty Mineral Resources, a division of Getty Oil. The three mines included in the project are in Eccles Canyon on leases obtained from federal and county agencies along the Emery-Carbon County line. Coastal States will operate the project, which has state and federal approval. Peak production from three Skyline mines, expected to occur in the early 1990s, should amount to about five million tons of coal per year. If development and construction proceed on schedule, initial coal production could begin in 1982. The coal produced by the Skyline mines is a low sulfur, bituminous coal.

AUSTRALIAN GOLD RUSH

A 400-ounce gold nugget was discovered in Australia and is estimated to be worth \$287,500.

INTERIOR REVISES COAL LEASING TARGET FOR UTAH

A revised coal leasing target of 322 million tons has been established for the Uinta-Southwestern Utah production region by the Interior Department.

The initial target of 109 million tons, set last year, did not take into account the approval of the Intermountain Power Project and the proposed exchange of coal preference right lease applications held by Utah Power and Light Company.

DOI Secretary Cecil Andrus said the 322-million-ton level would help satisfy the region's coal demands between 1985 and 1990 and would assure that federal coal plays a major role in meeting future energy needs.

Only 59.1 million tons of coal was produced last year on federal land (*Coal News*, 4-11-80). An informal moratorium on leasing has been in effect since 1971.

A total of 12.3 million tons were produced in Utah in 1979.

BASIN AND RANGE SECTION OFFICERS ELECTED

The Basin and Range Section of the Geothermal Resources Council (GRC) elected new officers in June. Officers for 1980 are: President, Duncan Foley, University of Utah Research Institute/-Earth Science Lab (UURI/ESL); Vice President, Ward Wagstaff (State Division of Water Rights); Sec.-Tres., Kip Smith (UURI/ESL). Holding office in 1979 were: President, Dennis Neilson (UURI/ESL); Vice President, Peter Murphy (UGMS); and Sec.Tres., Roger Harrison (formerly Terra Tek, Inc.).

GRAVITY SURVEY

UGMS has outlined and will conduct during the summer, a gravity survey within the Jordan Valley. The survey work will be done through a contract with Meiji Resource Consultants. Set up as a number of profiles over areas suspected or known to be over areas underlain by warm groundwater, the survey will consist of approximately 800 new gravity stations.

GEOTHERMAL ACTIVITIES

Summer Field Work

The major thrust of the UGMS low temperature geothermal assessment program is along the Wasatch Front from southern Utah Valley north to the Utah-Idaho state line. A number of activities are being carried out. First, the locations of many of the water wells within the six county area recorded by the Utah Division of Water Rights are being checked in the field. The existence of each well is then verified and its status determined (abandoned, pumped, flowing, etc.). Whenever possible, the well head temperature of the water is determined. In the Jordan Valley, a more comprehensive program is being followed, including collecting water samples for chemical analysis and determining the thermal gradient of wells.

Geothermal Heating at Utah State Prison

The Utah State Prison and the Utah Energy Office are continuing their investigation of using the geothermal energy from Crystal Hot Springs system to heat the minimum security portion at the prison. This work is being conducted through the U. S. Department of Energy's Project Opportunity Notice (PON) program. UGMS is assisting in this work, on a contract basis and has responsibility for resource assessment. Bids are currently being sought by UGMS for a test hole drilling program in the vicinity of the prison.

Geothermal Industries

Utah Roses, Inc., of Sandy, Utah, has recently purchased a portion of the Crystal Hot Springs adjacent to the Utah State Prison. They plan to use the hot geothermal waters (195°F or 90°C), produced from a 410 foot well (Survey Notes, vol. 14, no. 1) to heat a greenhouse complex. To date, three greenhouse units have been constructed and plans are being made for the drilling of a reinjection well.

CORRECTION

Our May 1980 issue of "Survey Notes" stated that AAPG Highway Maps were \$3.00 each plus handling. The cost has gone up to \$4.00 each with no handling charge.

GEOTHERMAL RESOURCES COUNCIL ANNUAL MEETING

Salt Lake City will host the annual meeting of the Geothermal Resources Council (GRC) September 9-11 at the Hotel Utah. Technical, poster and special sessions will cover topics related to exploration, development, economics and use of geothermal resources. Seven field trips have also been scheduled including a trip to geothermal systems of the Jordan Valley that will be led by J. W. Gwynn of UGMS. Registration forms and additional information can be obtained by writing the Council's national headquarters at P. O. Box 98, Davis, California 95616.

UTAH COAL BOUND FOR JAPAN

The first western United States steam coal to be exported to Japan has moved from Utah to the West Coast.

It will be used to generate energy in steel production. Previously, export shipments had been only metallurgical quality coal.

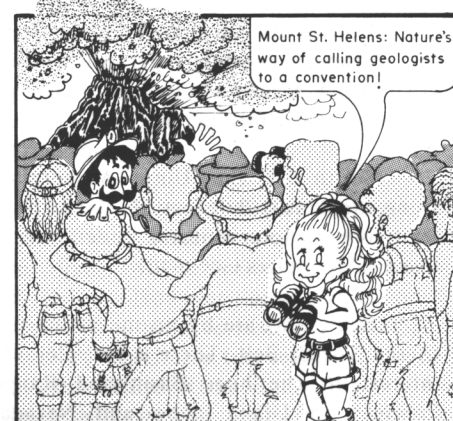
Interest in Western United States coal is intensifying because Pacific Rim countries are looking for ways to diversify their coal sources.

Under pressure to convert from gas and oil to coal, Far Eastern nations want assurance of a future coal supply and are considering the western U. S. as an additional source.

from Standard Examiner

IMA GEM

SANDY STEWART





The Great Salt Lake south shore marina.

THE GREAT SALT LAKE IS GREATER THAN YOU THINK

How much do you really know about the Wonder of the World that is in our own back yard?

The new UGMS publication *Great Salt Lake, a Scientific, Historical and Economic Overview* (Bulletin 116), is a compilation of 36 papers edited by J. Wallace Gwynn, Ph. D. It has 400 pages, 16 in full color, 2 oversize maps and 118 illustrations.

People have lived around Great Salt Lake for perhaps 40,000 years. The first white man did not see it until about 1825, but as early as 1710 maps were published which proposed the existence of the lake. At one time it was believed that an underground channel drained the lake into the Pacific Ocean, and in 1870 it was reported that a schooner had been sucked into the whirlpool assumed to exist at the head of this channel. And of course, there was a monster in the lake.

In spite of its barren and lifeless appearance, the area around Great Salt Lake, especially the swamp lands, is home to a wide variety of wildlife. In the lake itself are brine shrimp, algae and bacteria. Winds crossing the lake carry moisture to the fertile valleys of the northern Wasatch Front.

Great Salt Lake supports a number of industries which produce sodium chloride (table salt), and potassium, calcium, and magnesium salts. The brine is evaporated in large solar ponds; careful control of the process is necessary to separate the many salt compounds dissolved in the lake. Detailed brine chemistry is discussed in one of the chapters of the volume. In addition, there is a small brine shrimp industry; the brine shrimp are collected and sold for fish food.

Drilling in the lake, preceded by intensive geologic and geophysical studies, has found oil in the sedimentary basin underlying the lake. The oil is in fractured volcanics near the tar seeps of Rozel Point, in the north arm of the lake.

Sailing is a popular sport on Great Salt Lake, as are sand drags and racing across the Salt Flats. The many elegant resorts of yesteryear, abandoned when the waters of the lake receded, may be replaced by modern facilities along the south shore of the lake and on Antelope Island.

Hardbound, Bulletin 116 sells for \$12.00 over the counter or \$13.20 by mail, prepaid. Utah Residents add 5% sales tax (\$.60).

OGDEN EARTHFLOW BURIES PARKING LOT

An earthflow developed along the river bluffs that border Park Boulevard in downtown Ogden that smashed through a chainlink fence and buried seven cars in a parking lot. The slide, which consisted of tons of water saturated sand, gravel and trees, moved rapidly downslope into the parking lot of the River View Apartments early in the morning of July 6. As a precaution, Ogden City Police contacted the residents of the nearby apartment building and advised them to evacuate the premises. Fortunately no one was hurt.

The flow created a steep walled, v-shaped gully. It undermined the perimeter road around the Ogden City Cemetery which lies at the top of the bluff and threatened to disturb several graves. The police quickly erected barricades at the top and bottom of the gully

to keep curious onlookers away from the unstable sides which continued to sluff and cave in for several days.

Investigators from UGMS's Urban & Engineering Geology Section arrived at the site the next day to assist Ogden City personnel in the evaluation of the phenomenon.

Following the slide, a spring developed in the gully and began flowing at an estimated 150 to 200 gallons per minute. Ogden City crews turned off all the water mains in the area and checked the lines for leaks, but none were found. The water mains were left off for more than 12 hours but there was no decrease in flow from the spring. Initial chemical tests on the groundwater showed no traces of chlorine, which indicated the spring was not city water. Although UGMS's investigation into the cause of the earthflow and the source of the water is continuing, it appears that the slide developed in response to this year's extremely wet spring.

THREE-STATE THRUST BELT CONFERENCE

On June 26, the governors of Utah, Wyoming and Idaho, natural resources officials of the three states, and top officials of the U. S. Bureau of Land Management met in Salt Lake City for a working luncheon and conference. The meeting was designed to exchange information and coordinate the economic development of the Thrust Belt common to the three states. Of particular concern was the impact of drilling activity and tremendous industrial development centered in Uinta County, Wyoming.

The most mind-blowing presentation at the luncheon was given by Dr. Dan Miller, State Geologist of Wyoming. His report on the effect of Thrust Belt activity in Wyoming included trillions of cubic feet of gas, hundreds of millions of barrels of oil and condensate, trainloads of sulfur, thousands of people and billions of dollars, which left the audience dazzled by statistics. Following this, Howard Ritzma, Assistant Director of UGMS, gave a report on Utah's Thrust Belt which, in comparison, has a much more modest activity level.

U. S. AND UTAH OIL AND GAS RESERVES CONTINUE DECLINE

Reserves of oil and gas in Utah and the U. S. declined between 1978 and 1979, continuing a nine-year-long trend, according to statistics of the American Petroleum Institute and the American Gas Association published by Oil and Gas Journal. Data is tabulated in chart below.

UGMS reserve figures (Survey Notes, Feb. 1980) showed 225 million barrels for Utah which includes oil, natural gas liquids and indicated added reserves defined by API. The API total, 194 million, differs from the UGMS total mainly in the large reduction of oil attributed to Pineview field by API and by a higher estimate of gas liquids attributed to several Thrust Belt fields by UGMS.

The UGMS estimate of gas reserves for Utah, 1,300 billion cubic feet, is nearly twice the AGA estimate but includes reserves of sour gas, gas in "tight" sand reservoirs, and gas recycled in pressure maintenance and secondary recovery operations not now considered as reserve by AGA but producible in the future.

Of nearby Rocky Mountain states, Wyoming, Montana, Colorado and New Mexico all showed increases in gas reserves. Montana, Colorado and New Mexico all showed decreases in oil and natural gas liquid reserves. Wyoming showed substantial increases in all categories, largely from discoveries in the Thrust Belt area of Uinta County (Evanston area).

	U. S. (billion bbls)	Utah (billion bbls)
Crude Oil (barrels)		
Proved reserves, end 1978	27.804	.155371
Proved reserves, end 1979	27.051	.144342
Indicated added reserves, 1979*	3.570	.021800
Natural Gas (cubic feet)	(trillions cu. ft.)	(trillions cu. ft.)
Proved reserves, end 1978	200.302	.696655
Proved reserves, end 1979	199.917	.677079
Natural Gas Liquids (barrels)	(billion bbls)	(billion bbls)
Proved reserves, end 1978	5.926	.031714
Proved reserves, end 1979	5.655	.028192

*Includes additional recoveries in known reservoirs (in excess of the proved reserves) which engineering knowledge and judgement indicate will be economically available by application of enhanced recovery techniques, whether or not such program is currently installed. (API/OGJ).

GREAT SALT LAKE LEVEL HIGHEST SINCE 1977

Great Salt Lake levels rose rapidly through the Spring of 1980 reversing a declining trend that began in 1977. Gages read by the U. S. Geological Survey were as follows:

DATE	BOAT HARBOR (South Arm)	SALINE (North Arm)
May 1	4199.40	4197.90
May 15	4199.85	4198.10
June 1	4200.10	4198.35
June 15	4200.45	4198.50
July 1	4200.35	4198.45
July 15	4200.15	4198.40

Unofficial peak was 4200.55 on June 20. The lake rose 2.95 feet from the seasonal low of 4197.50 recorded October 15, 1979 to June 15, 1980, one of the largest annual increases on record.

UTAH GEOLOGICAL AND MINERAL SURVEY SURVEY NOTES

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